

The Economic Impacts on Agriculture of the Biological Opinion and Drought in 2009

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Richard Howitt, Duncan MacEwan, and Josue Medellin

UC Davis Department of Agricultural & Resource Economics,
and UC Davis Center for Watershed Sciences

The Modeling Team

- Combined multidisciplinary team from
- California Department of Water Resources,
- U.C Davis Department of Agricultural & Resource Economics and the UCD Center for Watershed Science
- Western Resource Economics
- Team members. Farhad Farnam, Steve Hatchett, Tom Hawkins, Ray Hoagland, Richard Howitt, Duncan MacEwan, Josue Medellin.
- The DWR-Swap model – A calibrated optimizing model currently with 26 agricultural regions.

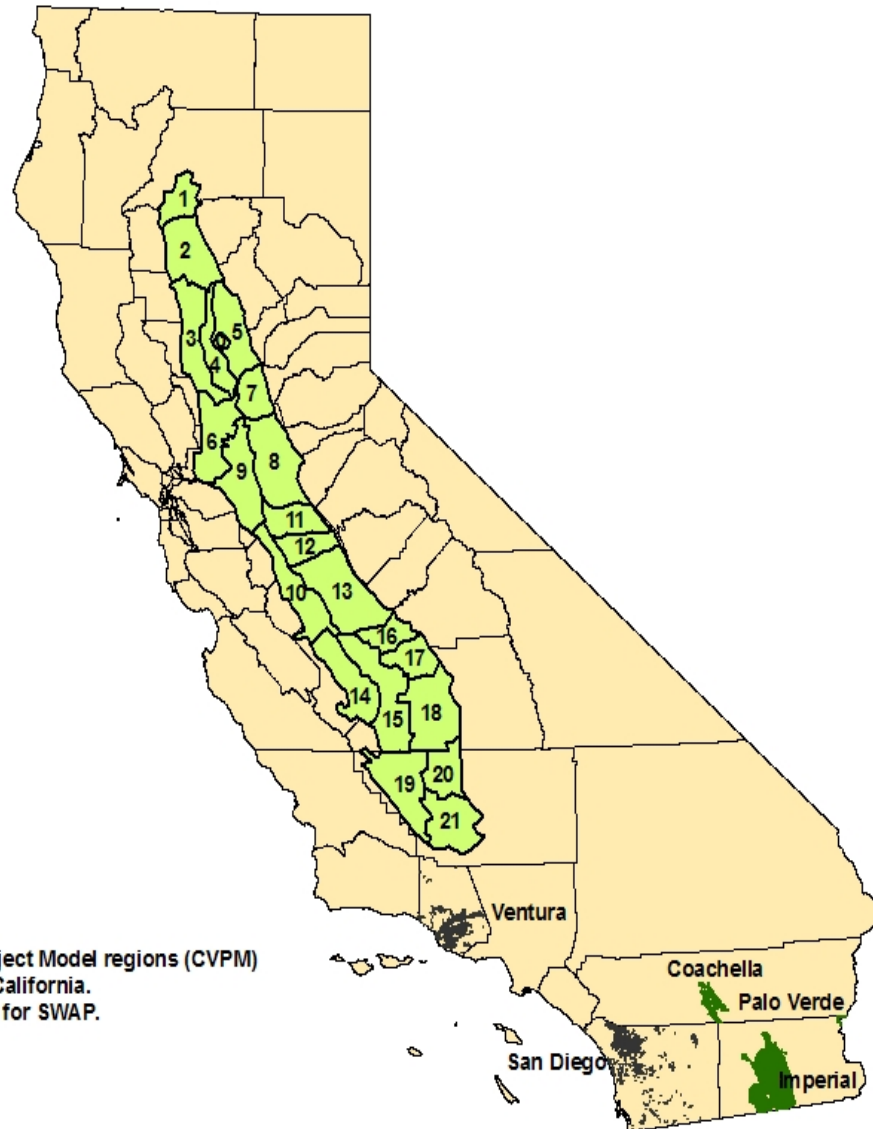
Model Specification

- Model assumes profit maximizing behavior by growers.
- Constrained by irrigated acres, water, production and cost functions.
- Sets minimum cuts in corn silage and perennial crops.
- Calibrated to 2005—2007 crop acres, 2008 prices and costs.
- Land and water use from DWR analyses.

Model Scenarios

- 85% cuts in CVP and SWP deliveries from the Delta
- A maximum of 50% increase in the 2005 regional groundwater pumping
- Corn grown will be sufficient for regional silage production of 40lbs/ head /day for 1.25 Million cows
- Perennial crop removal cannot exceed 4%
- Stress Irrigation cannot exceed 15%
- If water trades occur they will be:
 - South of the Delta within the valley
 - Assume no out-of-valley trades
 - Assume no additional groundwater pumping due to trades
 - Assume unrestricted trading within the valley

DWR-Swap Economic Model Regions



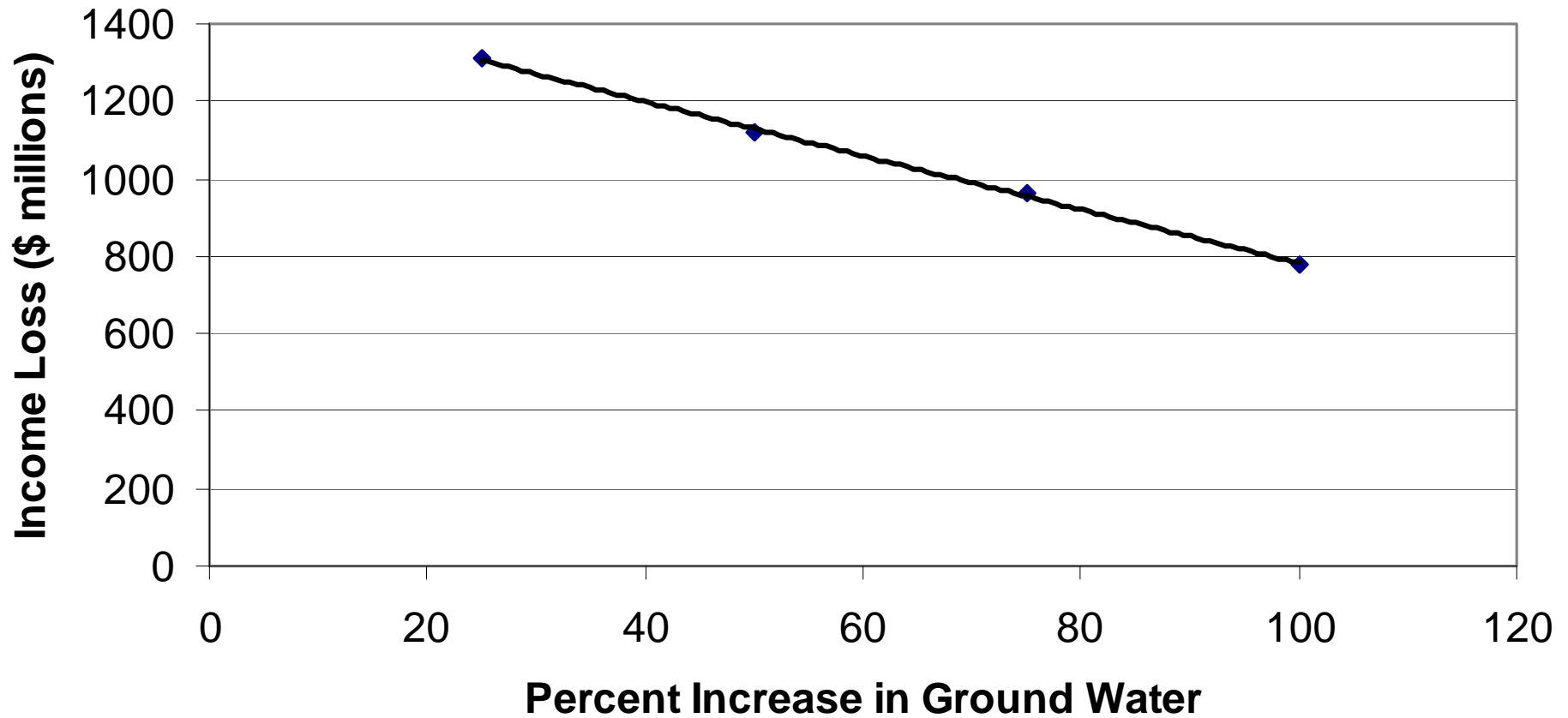
NOTE:

Light green indicates Central Valley Project Model regions (CVPM)

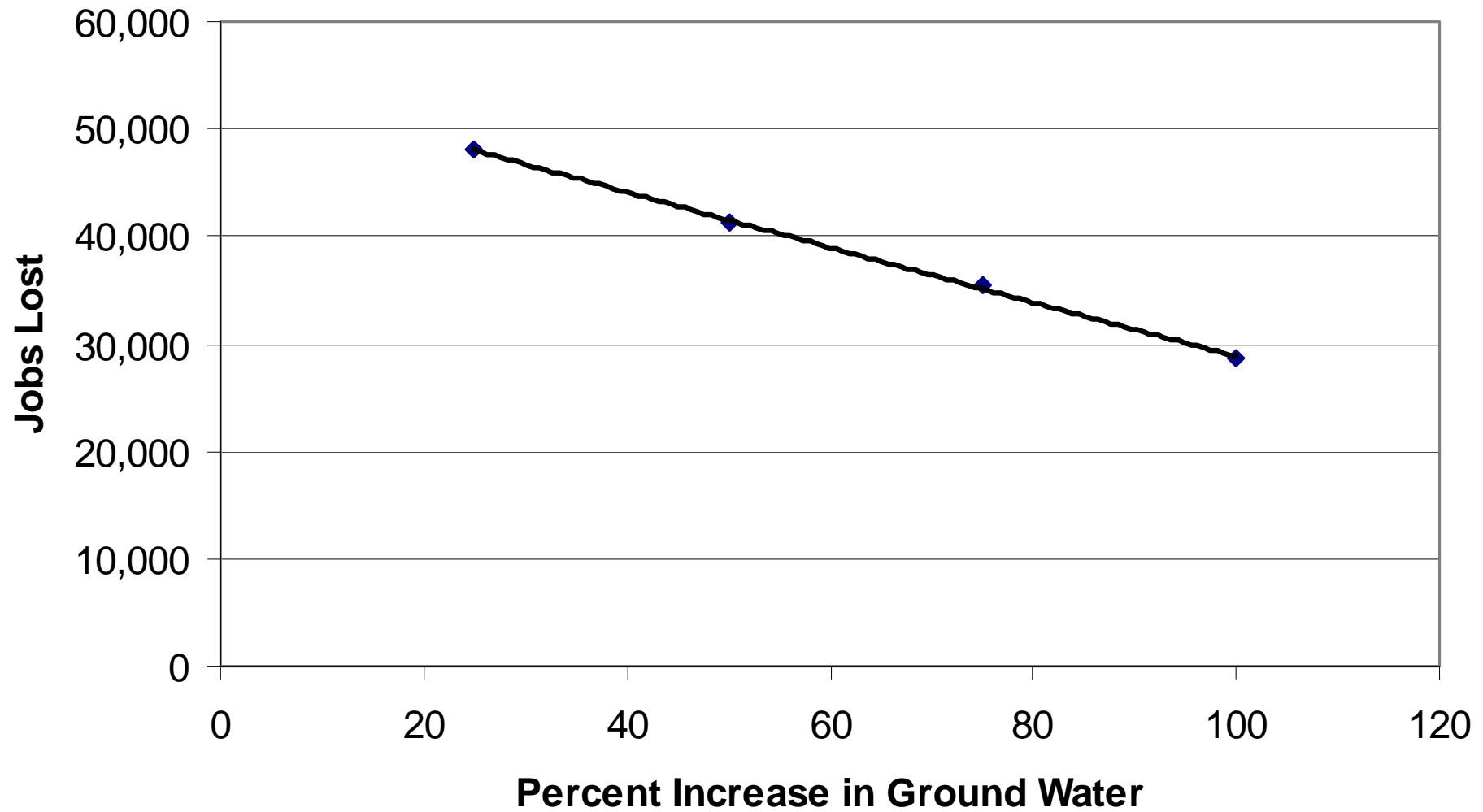
Dark green is agriculture for southern California.

Dark grey areas indicate future regions for SWAP.

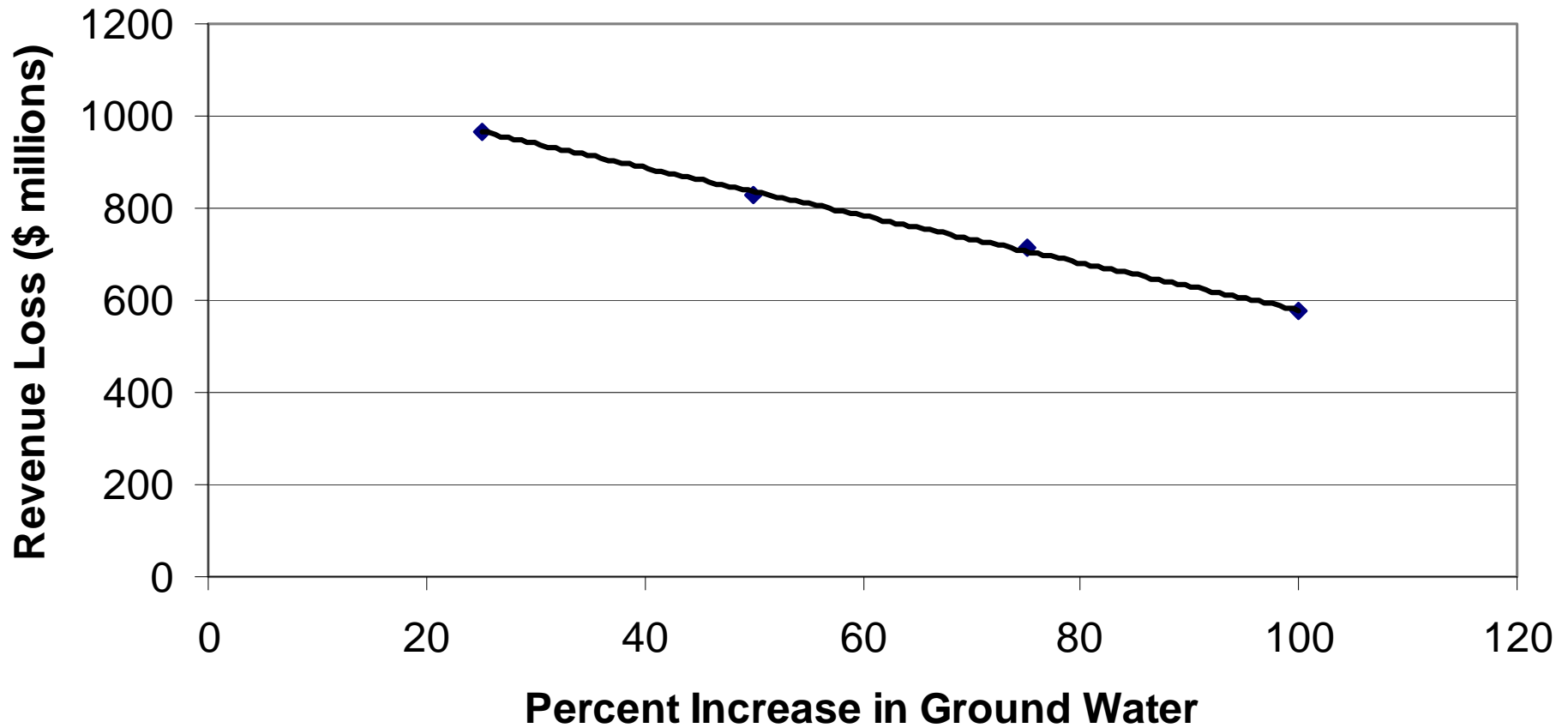
Valley Income Loss with 85% Reduction in CVP and SWP



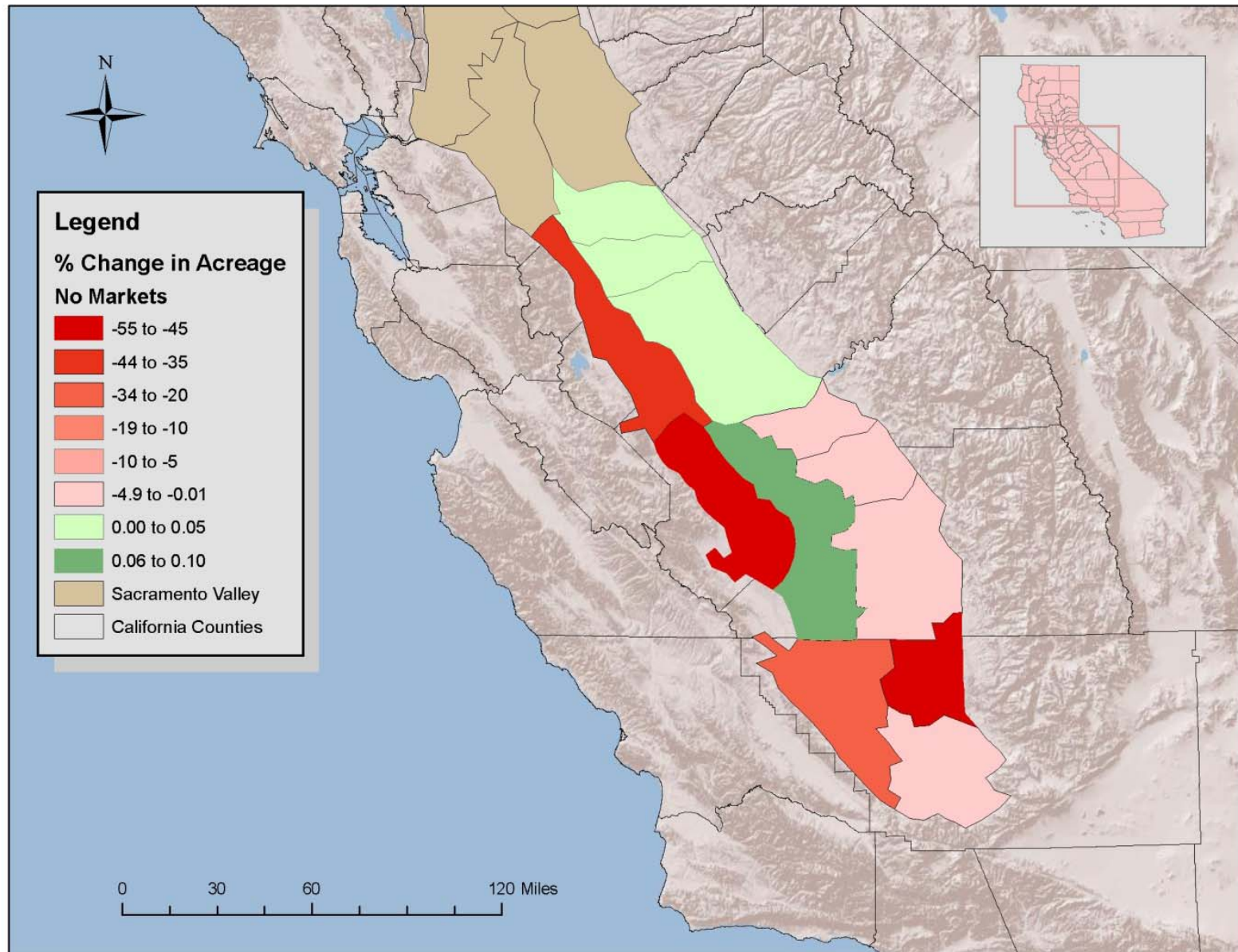
Valley Employment Loss with 85% Reduction in CVP and SWP



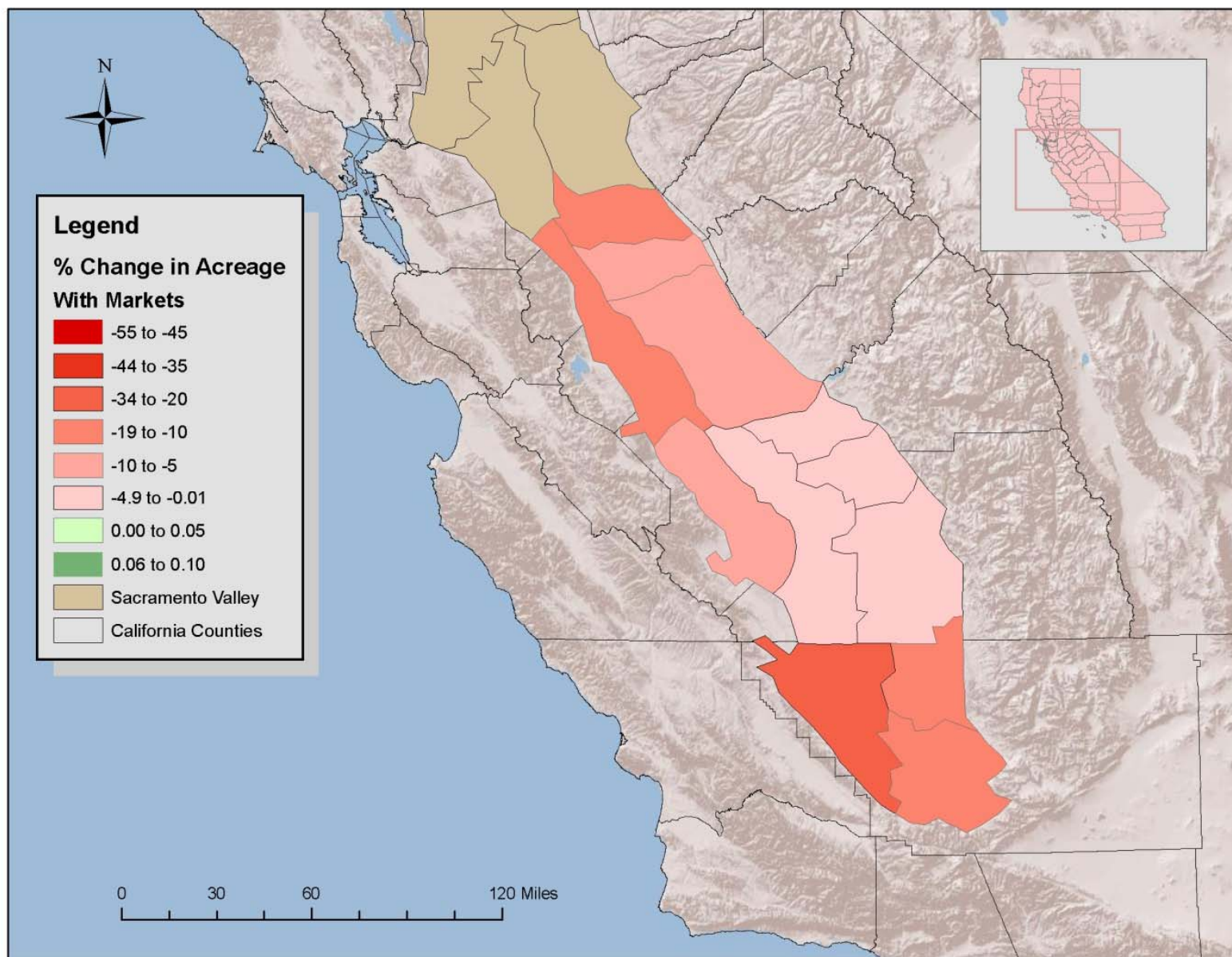
Farm Revenue Loss with 85% Decrease in CVP and SWP



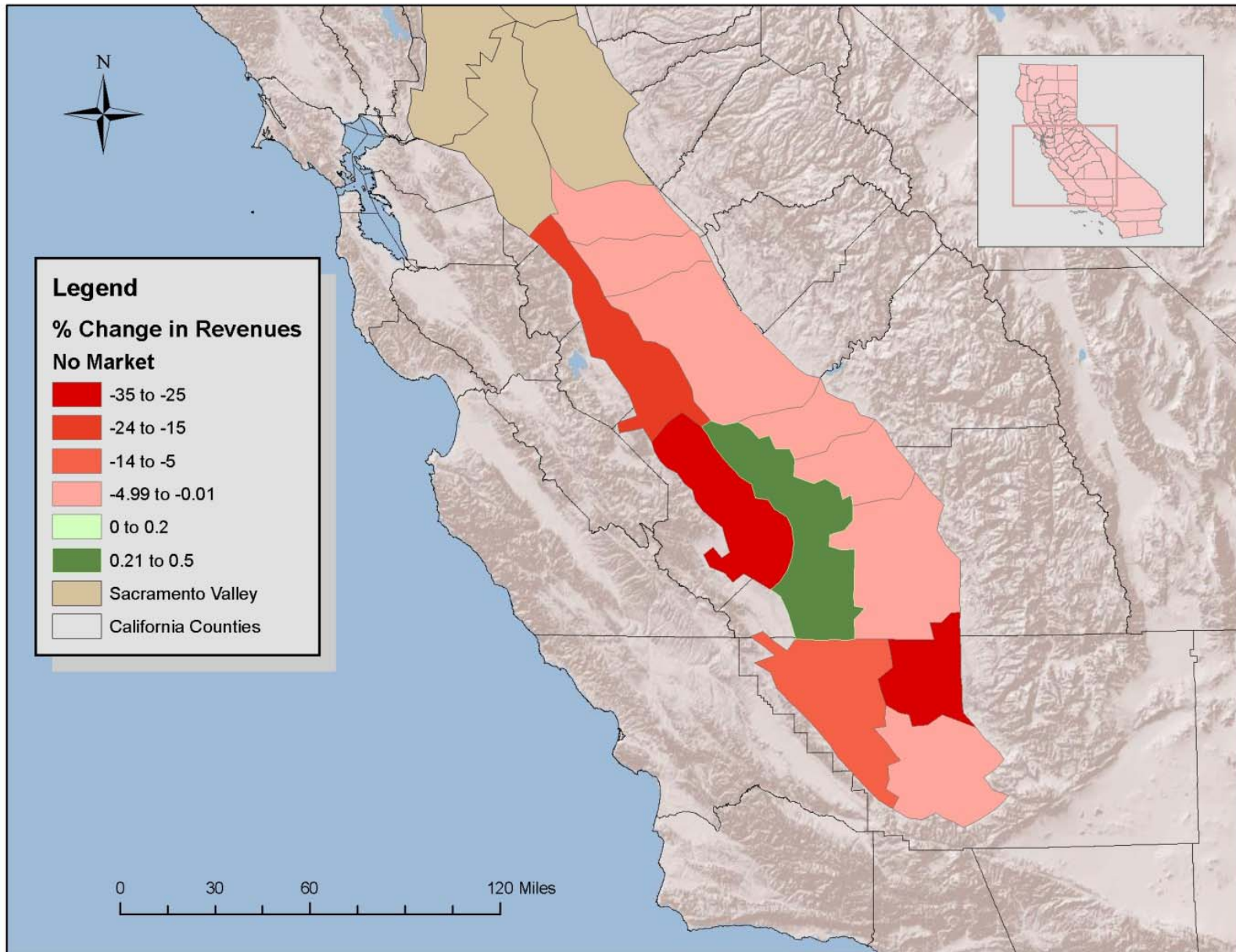
2009 Change in Crop Acres with No Markets



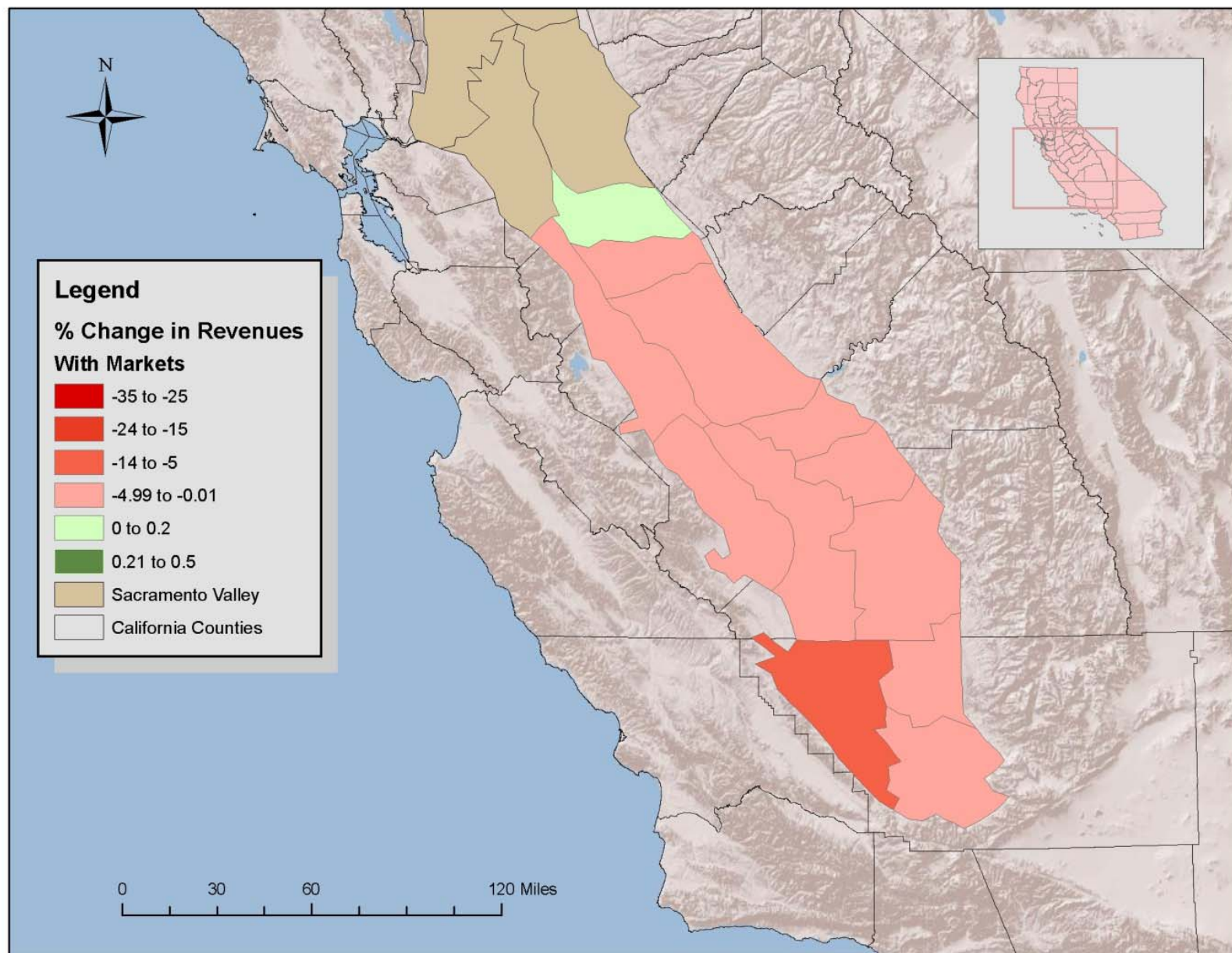
2009 Change in Crop Acres with Markets



2009 Change in Revenues with No Markets



2009 Change in Revenues with Markets



Conclusions

- **The 2009 severity of the economic impact of CVP & SWP cuts depends on the grower's ability to offset by:**
 - Increased groundwater pumping
 - Water trading
- **Under 85% export cuts and 50% groundwater increase**
 - 2009 job loss range 40,000
 - 2009 income loss range \$1.15 billion
 - Farm revenue loss \$800 million.
- **Reductions in the East-side source water deliveries will increase these losses.**
- **Flexible water trades are needed to reduce the concentration of impacts in a few regions and reduce costs by several 100 million**
- **More detailed regional modeling by the team is under way.**